Brianna DeSantis

Lesson 1 – Unit 6

6th grade life science

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| UNIT: 6 – Cells and Osmosis | |
| **Date: Week of 3/16/15** | *Lesson topic(s) and Essential Question(s):*  **Topic** – Elodea Plant Cell Lab  **Key Questions** – What is diffusion? What is osmosis? What is plasmolysis? What is the difference between a hypertonic and hypotonic solution? What happens to cells when they are put in hypertonic vs hypotonic solutions? Why is water a universal solvent and why do cells need water? |
| **Misconceptions about cells** | Animal and plant cells do not share similar organelles.  All cells look exactly like the cells in the textbook.  Cells contain only 1 of each organelle because that is what the book shows.  Organelles are alive.  Salt moves in and out of cells, rather than water.  Water stops moving in and out of cells when equilibrium is reached.  Cells “drink” water and it is not recycled. |
| **Aim** | Why do plant cells become firmer in hypotonic solutions and wilt in hypertonic solutions? |
| **Objectives** | Students will demonstrate application by defining key terms related to osmosis and by observing cells placed in different solutions of salt water (hypertonic, hypotonic, isotonic)  Students will demonstrate knowledge by identifying how water is essential to cell processes and seeing how cells are affected on the micro-scale level when water levels change. |
| **Do Now** | 1. Write down homework in planner 2. Write down date, AIM, heading in notebook 3. Add some food coloring to your beaker of water, observe what happens over 3minutes without mixing. Write down your observations. Why does this happen? |
| **Standards Addressed:** | 1.1a Living things are composed of cells. Cells provide structure and carry on major functions to sustain life. Cells are usually microscopic in size.  1.1b The way in which cells function is similar in all living things. Cells grow and divide, producing more cells. Cells take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs.  6.1c Matter is transferred from one organism to another and between organisms and their physical environment. Water, nitrogen, carbon dioxide, and oxygen are examples of substances cycled between the living and nonliving environment. |
| **Teacher competencies** | 1e – Designing coherent instruction |
| **Procedure:**  **Activities & Tasks**   |  |  |  | | --- | --- | --- | | ***Time*** | ***Activity*** | ***Materials*** | | 5 min | Remind students to write down homework, AIM and answer the DO NOW. |  | | 5 minutes | Students write down answer to the DO NOW. |  | | ~5 minutes | Go over DO NOW | Student volunteers | | ~5 minutes | Copy and explain definitions related to water movement and cells  (diffusion, osmosis, plasmolysis, turgor pressure, hypertonic, hypotonic, isotonic) | Smart board, handout | | ~5 minutes | Model how to make a wet mount and explain activity | Microscopes, cover slips, pipettes, elodea cells, water, salt water | | ~20 minutes | Students fill out their worksheets (see page 4) by performing the elodea lab.  They start with tap water and then they add salt water. They make conclusions about how water rushing in and out towards solutes affects cells. | Worksheet (see page 4) | | |
| **Differentiation** | A hands-on activity will allow students to see cells in action before learning about the affects of salt and diffusion on cell activity and structure. They are grouped according to levels. Model wet mount preparation. |
| **Assessment** | Answers to conclusion questions on worksheet.  Formative – use of microscope and drawings of cells  Lab report on celery and carrot diffusion lab (which will be based off of this lab). |
| **Homework** | Make conclusions about the elodea lab and finish questions. |

**Words for word wall:**

Diffusion – movement of particles from high to low

Osmosis – the diffusion of water through a cell membrane

Plasmolysis – when plant cells lose water to a hypertonic solution

Hypertonic – a solution that contains more solute than solvent

Hypotonic – a solution that contains more solvent than solute

Isotonic – a solution that contains the same concentration of solute as another solution.

Name:

Class:

Drawing of Elodea Cells in Scanning Objective Before and After Putting them in Hypotonic and Hypertonic Solutions

**Directions**: Draw the cells as you see them in a hypotonic solution (left) and a hypertonic solution (right). Label the cytoplasm, cell wall, cell membrane, chloroplasts and vacuole.

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| Scanning (4x)  Total Magnification: | Scanning (4x)  Total Magnification: |

**Hypothesis: What do you predict will happen when you observe Elodea cells in the following solutions under the microscope? Explain your hypothesis!**

Tap Water (hypotonic): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Salt Water (hypertonic):

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**Follow-Up Questions:**

1. Why are chloroplasts green in the elodea plant?
2. Where is the vacuole? What is it filled with?
3. What is cytoplasmic streaming? Why does it happen?
4. What happens to the vacuole when the cell is placed in the hypotonic solution? Why?
5. What happens to the vacuole when the cell is placed in the hypertonic solution? Why?
6. What molecules must enter the cell for photosynthesis to happen?
7. What are the products of photosynthesis?
8. Was your hypothesis supported by your observations? Why or why not?
9. Based on these results, why do you think putting salt on icy roads can be harmful to the plants that live near the streets?

**Grading Rubric For Lesson**

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|  | 4 | 3 | 2 | 1 |
| **Knowledge** | Questions are answered correctly and thoroughly using data and lab experience. | Questions are mostly answered correctly and thoroughly using data and lab experience. | Questions are partially answered correctly and thoroughly and does not refer to lab experience. | Questions are incomplete. |
| **Drawings** | Drawings of cells are detailed and labeled. | Drawings of cells are labeled but could be more detailed. | Drawings of cells are mostly incomplete and not labeled. | Drawings of cells are nonexistent or incomplete and not labeled. |
| **Lab Performance** | Uses microscope correctly and follows directions. | Does not draw cells under required magnification. | Can not focus microscope and does not complete assignment using materials provided. | Does not follow lab protocol or use microscope properly. |
| **Scientific Inquiry** | Follows the steps of the scientific method throughout lab. | NA | NA | Does not follow the steps of the scientific method. Does not make a hypothesis before observing cells. |